International Journal of Advanced Engineering Research and Science (IJAERS) *[Vol-4, Issue-4, Apr- 2017]*
https://dx.doi.org/10.22161/ijaers.4.4.11 *ISSN: 2349-6495(P) | 2456-1908(O)*

Student's Learning Evaluation Using Learning Analytics

Prof. U. M. Kalshetti, Keyur Kulkarni, Deepenkumar Patel, Sharang Nimbalkar

Department of Information Technology, PVG's COET, Pune, India

Abstract— *In the current education system Teachers have to manually access each and every answer sheet of the student. It is very difficult to analyze each and every student and keep track of their progress, what they're good at or are lagging behind. Hence, it's a very time consuming and tedious process. Also there is no system tool for self-evaluation. The proposed system automatically generates Gap-Fill or one line questions from the input text. Provided it has a maintained list of keywords. When the students appear for the test, currently there is no system where automatic questions will be generated according to the test topic selected. This system proposes automatic question generator for a particular topic that would minimize the workload of the teachers by generating number of multiple Fill in the Blank questions for regular class tests. The students are evaluated on the generated questions. System also determines the polarity of the feedback given by the student. System helps teacher analyze student's feedback about a topic and how well they've understood the topic, so that the teachers could resolve their problems and would help students work in particular area in which they're weak.*

Keywords—Learning Analytics.

I. INTRODUCTION

To know the behaviour of learners is important. One of the most effective ways to collect this invaluable data is through learning analytics. Learning Analytics is the collection of data that is gathered while learners are engaging in the eLearning experience.

Analytics also consist of the analysis and reporting of this information. Learning Analytics also offer online facilitators and instructors a comprehensive look at how a learner is performing, if the learner may need additional help with a particular lesson or subject, and even if the learner is likely to pass or not an eLearning course. Such data can then be used to make educational analysis and predictions that help to determine which learning materials are appropriate, useful or irrelevant for the learners. This is primarily based upon learner's performance, skill level, and personal interests.

Learning analytics have the power to enhance eLearning experience and create more effective eLearning environments.

Feedback serves to close the gap between the learner's current understanding and the desired understanding. Regular and informative feedback can keep students away from misconceptions and increase confidence and motivation in them.

Currently it is not possible for instructors to provide timely feedback to every individual student and vice versa. In this module we provide students automatic instant feedback after their interactions of online test. However, how students choose to interact with the system and how it has influenced students' learning experience is rarely well understood. The findings provide solutions for improvement in various areas.

In this paper we propose a system which will generate questions automatically, eliminating the extra work of the teachers by minimizing the work load. The questions are generated depending on the sentences in the paragraph. A test is conducted on the generated questions and when students appear for the test, they are evaluated and their process is further analyzed. The student gives feedback about the system and a final report is generated showing the final evaluation of students as well as the system.

II. QUESTION GENERATION

Gap-Fill questions are Fill-in-the-blank questions, where one or more words are removed from a sentence/paragraph and potential answers are listed. These questions, being multiple choice ones, are easy to evaluate. Preparing these questions manually will take a lot of time and effort. This is where automatic Gap-Fill question generation (GFQG) from a given text is useful.

1. INSERT is _____ type of SQL command? (a) Data Definition Language (b) Data Manipulation Language (c) Data Command Language (d) Data Query Language (correct answer: Data Definition Language)

In a gap-fill question (GFQ) such as the one above, we refer to the sentence with the gap as the question sentence(QS) and the sentence in the text that is used to generate the QS as the gap-fill sentence (GFS). The word(s) which is removed from a GFS to form the QS is referred to as the key while the three alternatives in the question are called as distractors, as they are used to distract the students from the correct answer.

In this module the input text will be provided by the

https://dx.doi.org/10.22161/ijaers.4.4.11 *ISSN: 2349-6495(P) | 2456-1908(O)*

teacher. The input consists of the text document, which contains all the topics in detail taught by the teacher to the students in the class. For current analysis we have considered topic Database Management System. Therefore, teacher after covering any topic from DBMS, when ready to take test, gives input to the system. Along with this text document another input is required which is the list of important keywords which are present in the topic. These Keywords are the important words which a student must minimally know after studying a topic. For the generation of questions these keywords play a vital role, as both the MCQs and the Fill in the Blank questions are dependent on the keywords itself.

Now after taking both the Input text and the keywords list, the input text will be further processed and Gap Fill questions will be generated. Processing of text involves omission of context from the text, i.e., forming context free grammar. It includes replacing all the pronouns with the respective nouns and forming a meaningful question. If the sentence contains unresolved context in it, might cause inappropriate formation of questions. Gap-Fill questions which are the Fill in the Blank questions where one or more words are removed from the sentence or paragraph.

Teacher has the following options of generating questions:

Fill in the blanks question generation:

The Gap-Fill questions are generated in following steps:

1. Finding the keyword from the sentence: The important keywords have to be given by the teacher from the topic been taught. The keywords must cover all the points of the topic. This work has to be done manually.
2. Removing/Replacing the keyword: The Input text document is read sentence by sentence. If the keyword from the keyword file is present in the input text file, The keyword is replaced with blank spaces.
   E.g.: SELECT keyword is used for data querying.
2. (where SELECT is the keyword being replaced by the blank spaces.)
3. Generation of question: The blank spaces created in the sentence forms the fill in the blank question. In this way whole document is read and the number of keywords occurring in the text document are replaced and number of questions are formed. Therefore the number of questions generated depends on the occurrence of the keywords in the file.

E.g.: from the above input following question is generated.

_____ keyword is used for data querying.

Multiple Choice Questions Generation:

The Multiple Choice Questions are generated in the following steps:

1. Finding the keyword from the sentence: The important keywords have to be given by the teacher from the topic been taught. The keywords must cover all the points of the topic. This work has to be done manually.
2. Finding Distracters similar to the keyword: The Input text document is read sentence by sentence. The keywords similar to actual answer are selected and given as options.
3. Generation of question: The Distracters created in the sentence forms the MCQs. In this way whole document is read and the number of keywords occurring in the text document are replaced and number of questions are formed. Therefore the number of questions generated depends on the occurrence of the keywords in the file.

Based on these questions, students will be analyzed and we would come to know that the student has understood the topic or not. System allows Teachers to select the topic of the test and the difficulty level of the questions which need to be generated.

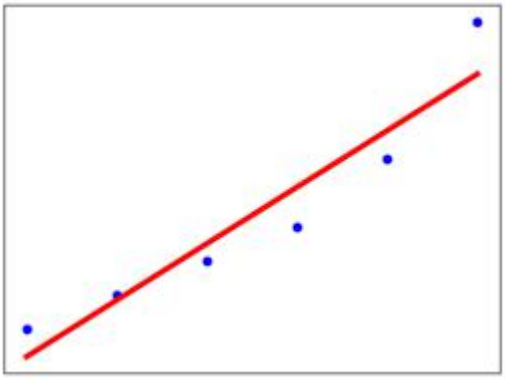
III. EVALUATION

After the successful generation of question the students have to be further evaluated. Now various hypothesis are proposed and results are generated on these hypothesis. The number of questions attempted by the students, total questions answered correctly all play an important role.

From the students perspective the system provides us with graph based progress to analyze where a particular student stands in the class and the areas in which they are good at or need improvement.

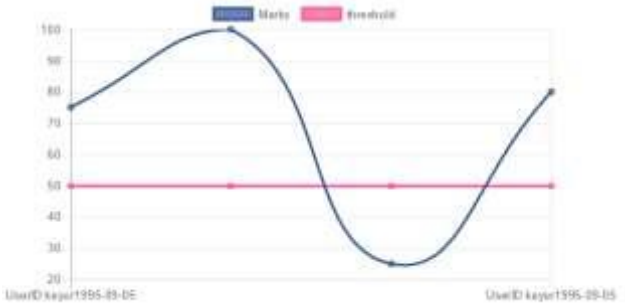
There are Three types of analysis conducted on the students. They are Predictive Analysis :In this analysis we tell what might happen in the future. Predictive analytics is the practice of extracting information from existing data sets in order to determine patterns and predict future outcomes and trends. Linear regression is performed to predict the further values (progress of the student in our case).

https://dx.doi.org/10.22161/ijaers.4.4.11 *ISSN: 2349-6495(P) | 2456-1908(O)*



Linear Regression depends on one dependent and an independent variable which are the marks and test id respectively for the evaluation of student. Hence the progress of student is next predicted by the current marks scored by the student.

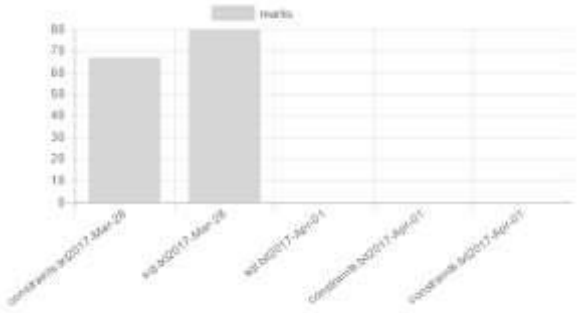
Diagnostic Analysis : The analysis in done in regards to the previous performance of the students on the test. Diagnostic Analysis tells us why did a particular thing happen by looking at the past performance. The result of the analysis is an analytic dashboard. It is used for discovery or to determine why something happened?



In the proposed system the a student appears of number of tests, the result of each test is calculated. Based on these results students is evaluated and remedies are proposed for further improvement if any required. Students are judged on their attendance and marks obtained in that topic. Hence, the solutions of

- Remedial Teaching: If the marks obtained in the test as well as attendance both are low, the student is advised to attend extra lectures so that he could cover up all the missed topic and come at par of other students in the class.
- Retest: If the attendance of the student is above the threshold value but marks scored are less, the students is suggested to appear for tests again. This would increase the practice of the students and help him score better the upcoming tests.
- Counseling: There are some students who despite having low attendance score better in tests. These students may have better grasping power but are counseled to attend the lectures as their low attendance can get them in trouble. These students are counseled to know what problems they face while attending lectures? What drives them away from the classroom?
- Consistent Students: These are the students who attend lectures regularly and score good in exams too. But if in any test they lag behind, immediately a notification is sent and the problems they've faced are solved.

Descriptive Analysis : In this analysis statistics are used to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data.



When the students appear for the test, The class average of the particular test is calculated and teacher comes to know what actually students have understood from that topic. The results are shown in the form of bar graph.

IV. FEEDBACK

We know that students develop their understanding of a concept based on their prior knowledge and experiences. Feedback plays an important role in closing the gap between current understanding and the desired goal, enhancing student performance and achievement.

Student behaviors in online learning platforms plays an important role. Even if we provide the right level of feedback at the right time, there can still be numerous ways in which students interact with these feedback features online outside of the controlled classroom environment.

The students are asked to give feedback about their learning process. How well they've understood the topics. This is simply done by providing students with the rating feature where students can rate the overall experience as well as about the topic learnt and the shortcomings of the teacher.

Research Questions from feedback

Based on our conceptual framework and existing literature, we ask foundational questions in our study:

(1) The topic taught was clear or not?

https://dx.doi.org/10.22161/ijaers.4.4.11 *ISSN: 2349-6495(P) | 2456-1908(O)*

(2) Doubts were been cleared on regular basis or not?
(3) Keywords used by the teacher were relevant or not?

V. CONCLUSION

This paper helps us evaluate the students by answering the questions generated. We look forward to experimenting on larger data by combining the chapters. Evaluation of course coverage by our system and use of semantic features will be part of our future work.

Also the feedback of the students help teachers understand what students actually have understood, and the areas where they need to work more on. We hope that the proposed system will help in the long run to not only test but also to analyze students' in an efficient way. After all, tedious learning must not hinder students understanding about a particular topic.

REFERENCES

[1] KithsiriJayakodi, MadhushiBandara, and IndikaPerera, "An Automatic Classifier for exam questions in Engineering," IEEE International Conference on Teaching, Assessment and Learning for Engineering 10-12 December 2015, China, Page 195-202.*(references)*

[2] Mario Manso-Vazequez, "A monitoring system to ease self-regulated learning processes," IEEE revistaiberoamericana de tecnologias del aprendizaje, vol. 10, no. 2, Page 52-59.

[3] Ebner M., Kinshuk, Wohlhart D., Taraghi B., & Kumar V. Learning analytics. The journal of universal computer science, 21, 1–6, 2015.

[4] George Garman, "A Logistic Approach To Predicting Student Success In Online Database Courses", American Journal of Business Education, Vol.3, No.12, 2010.

[5] Hiroaki Ogata, Songran Liu, KousukeMouri, "Ubiquitous Learning Analytics using Learning Logs".